135289 39

ROHM AND HAAS COMPANY

ENGINEERING DIVISION

May 17, 1972

RECD MAY 19 72

cc: Mr. Hall, Mr. Kenny, Dr. Winters, Mr. Ambrogi, Mr. Broderick, Mr. Ewing/Mr. Myers, Mr. Geniesse/file, Dr. Nemec

REPORT: S. S. Paist

FROM: Meeting with the Environmental Protection Agency (EPA) Regarding the Disposal of Whitmoyer Arsenical Wastes now Stored in Paulsboro, New Jersey

At 10:00 A.M. on May 12, 1972, Mr. Broderick of the law firm of Dechert, Price & Rhoads, Dr. Nemec and Messrs. Ambrogi and Paist, met with officials of the EPA's Region III in the EPA offices at 6th and Walnut Streets, Philadelphia, to discuss the disposal of about 1,000,000 gallons of arsenical wastes now stored in Paulsboro, New Jersey. Mr. Rasnic of the Water Pollution Control Division appeared to control the EPA Region III decisions in the matter and had technical and legal staff members present as well as a member of the EPA Cincinnati laboratory who had formulated the chemical/physical treatments described by Mr. Kirk, EPA Washington Counsel, in his letter of February 15, 1972, to Mr. Broderick.

In the course of the two-hour discussion, it is believed that there was general agreement about the costs, advantages and disadvantages of the chemical/physical treatment of the waste. One important area of possible disagreement centered on the concentration of the dissolved arsenical wastes remaining in the supernatant after the material was treated and the solids precipitated. Rohm and Haas believed that the minimum dissolved arsenical content of the supernatant would not be below 5 ppm with a probable concentration of 16 ppm during actual treatment under field conditions. An EPA staff member indicated he had an R. F. Weston report that indicated arsenical wastes could be treated so as to leave no more than 0.05 ppm of arsenical content in the supernatant. We indicated we would like the reference to examine in detail. (We shall also request the study directly from Mr. Weston.)

Since dilution of some liquid, either due to its arsenical or salt content, would be required for any of the chemical/physical treatments, we requested a thoughtful examination of our "visual aids" indicating a method of releasing the Paulsboro material into the sea under controlled conditions

that not only would protect fully the environment, but would also eliminate the potential hazard of an uncontrolled release of the stored material. We asked for a response, requesting the additional information Region III officials would require before they could make a technical judgment regarding our proposal, and discussing the technicalities on which we should base our requests for official approval for the burial of solids and the dilution of the supernatant remaining from the use of the chemical/physical treatment.

Mr. Rasnic indicated that the Director of Region III would respond in a few weeks.

The chances continue small for ocean disposal of the Paulsboro liquid without pretreatment. We shall continue to search for adequate solids disposal sites while we await a reply from the EPA.

Our best chance to obtain help from Region III is to have the technical people there see clearly that they have been "fooling around" with the technical half-solutions to effectuate an emotionally and politically satisfying conclusion in which Rohm and Haas is the only loser.

Copies of the materials left with Mr. Rasnic are attached.

S. S. Paist

SSP:bd

Attachments

Arsenical Liquid Waste Disposal

I. Precipitate With 25% Calcium Chloride Solution At Myerstown

X A.	Transport liquid waste to Myerstown	$ 42,000
	Raw material	18,000
	Filter solids (cost included below)	-
	Hold filtrate prior to 4600 - 1 dilution (cost included below)	-
	Wet solids to pit (55,000 cu. ft.)	75,000
	*Processing equipment (see memo Huffman to Ambrogi 3/13/72)	114,000
	Labor (6 months actual processing time—4 men-5 day schedule)	15,000
		$ 264,000
X B.	Transport waste liquor to Myerstown	42,000
	Precipitate with 25% $CaCl_2$ solution--raw material	18,000
	Filter solids (costs below)	-
	Hold filtrate prior to 4600-1 dilution (costs below)	-
	Dry solids (costs below)	-
	Dry solids to pit (20,500 cu. ft.)	28,000
	Processing equipment	147,000
	Labor (same as A)	15,000
		$ 250,000

Both alternatives A and B would present a questionable method of liquid disposal after solids removed. The time element of ca 3 1/2 years due to restriction of water volume availability for dilution, is unsatisfactory.

II. Precipitate With $ZnCl_2$ Solution At Myerstown

X C.	Transport waste liquor to Myerstown	42,000
	Raw material	13,000
	Filter solids (costs below)	-
	Hold filtrate prior to 2400-1 dilution (costs below)	-
	Wet solids to pit (70,300 cu. ft.)	93,000
	Processing equipment	114,000
	Labor (same as A)	15,000
		$ 277,000

Arsenical Liquid Waste Disposal

X D.	Transport waste liquors to Myerstown	$ 42,000
	Precipitate with $ZnCl_2$ solution	13,000
	Filter solids (costs below)	-
	Hold filtrate prior to 2400-1 dilution (costs below)	-
	Dry solids (costs below)	-
	Dry solids to pit (25,000 cu. ft.)	35,000
	Processing equipment	147,000
	Labor (same as A)	15,000
		$ 252,000

* Both alternatives C and D fall into the same category of liquid disposal after solids removal as A and B, except the time element is ca 2 years.

III. Precipitate With Ferric Sulfate - Calcium Carbonate At Myerstown

OK E.	Transport waste liquors to Myerstown	42,000
	Raw material	97,000
	Filter solids (costs below)	-
	Dilute filtrate 320-1 prior to creek disposal (costs below)	-
	Wet solids to pit (90,300 cu. ft.)	120,000
	Processing equipment	114,000
	Labor (same as A)	15,000
		$ 388,000

IV. Precipitate With Ferric Sulfate-Calcium Gluconate

OK F.	Transport waste liquors to Myerstown	42,000
	Raw material	97,000
	Filter solids (costs below)	-
	Dilute filtrate 320-1 prior to creek disposal	-
	Dry solids (costs below)	-
	Dry solids to pit (106,900 cu. ft.)	145,000
	Processing equipment	147,000
	Labor (same as A)	15,000
		$ 446,000

Arsenical Liquid Waste Disposal

OK

G.	Transport waste liquors to Myerstown - - - -	$ 42,000
	Precipitate with ferric sulfate-calcium gluconate-raw material	97,000
	Filter solids (costs below) - - - - - -	-
	Dilute filtrate 320-1 prior to creek disposal - - -	-
	Drum wet solids (90,300 cu. ft.) - - - - -	51,000
	Processing equipment - - - - - -	114,000
	Labor (est. for drum handling and regular processing)- -	25,000
		$ 329,000

OK

H.	Transport waste liquors to Myerstown - - - -	42,000
	Precipitate with ferric sulfate-calcium gluconate-raw material	97,000
	Filter solids (costs below) - - - - - -	-
	Dilute filtrate 320-1 prior to creek disposal - - -	-
	Dry solids (costs below) - - - - - -	-
	Drum dry solids (106,900 cu. ft.) - - - - -	60,000
	Processing equipment - - - - - - -	147,000
	Labor - - - - - - - - -	22,000
		$ 368,000

2 years to do

Comment for alternatives G and H: What is ultimate disposition of the drums containing the solids?

I. Similar operation to "G" except the drummed solids are transported to ultimate storage in Pittsburgh, Pennsylvania area.

Additional transportation costs - - - - -	$ 113,000
"G" Cost -	= 329,000
	$ 442,000

J. Similar operation to "H" except the drummed solids are transported to ultimate storage in Pittsburgh, Pennsylvania area.

Additional transportation costs - - - - -	$ 69,000
"H" Cost -	= 368,000
	$ 437,000

Arsenical Liquid Waste Disposal

V. Spray Drying

K.	Transportation of waste liquor to Trenton, New Jersey -	$ 29,000
	Spray dry - - - - - - - -	243,000
	Dried solids transport to Myerstown pit (88,100 cu. ft.) -	24,000
	Pit costs - - - - - - - -	120,000
		$ 416,000

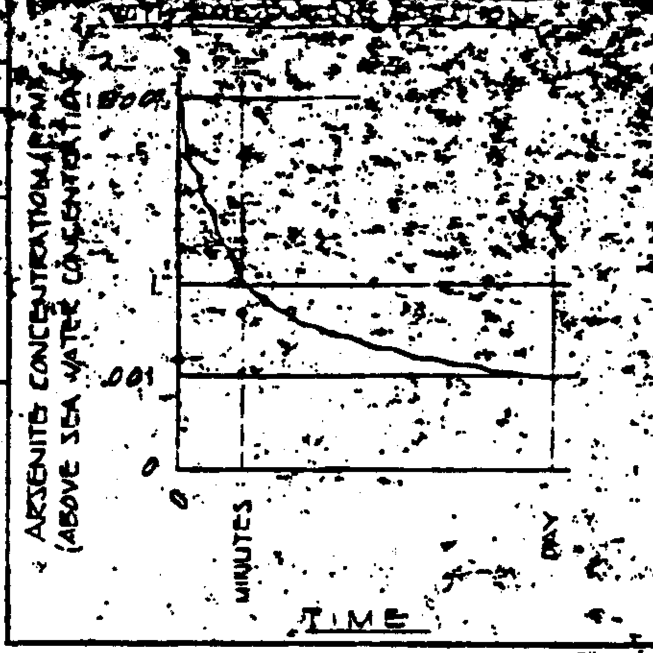
L.	Same as "K" except solids would be drummed and returned to Myerstown. Ultimate disposal site - - ?	
	Drum storage costs - - - - - -	$ 50,000
	"K" costs -pit =	296,000
		$ 346,000

M.	Same as "L" except drummed solids would be sent to Pittsburgh, Pennsylvania for final storage.	
	Difference between Pittsburgh and Myerstown transportation =	+ 14,000
	"L" costs =	346,000
		$ 360,000

VI. Storage

N.	Assume continue Paulsboro, New Jersey rental and continue storage - - - - - - - -	$ 30,000/yea
O.	Assumes erecting storage facilities in Myerstown, transporting the waste stream back, and just storing forever -	$ 227,000
P.	Assumes transporting waste liquor to Louisville, Kentucky, and store forever in an existing holding tank - -	$ 125,000

TOTAL TIME DISCHARGE (DAYS)	PUMPING RATE (GPM)
12.5	100,000
15.0	83,500
30.0	41,800



AVERAGE CONCENTRATION 1 PPM (ABOVE ARSENIC CONCENTRATION IN SEA WATER).

MIXING FROM OCEAN DISPERSION WILL DILUTE WASTE FROM 1 PPM TO .001 PPM IN [illegible] CONCENTRATIONS ARE [illegible] TO [illegible] LEVELS IN THE SEA WATER. LOCATION OF DISCHARGE TO BE AT LEAST [illegible] MILES FROM SHORE.

FLOW

NOTE:

CONCENTRATION OF ARSENIC IN SEA WATER IS .002 TO .005 PPM ARSENIC AS STATED BY H.A. SCHROEDER AND J.J. BALASSA IN "ABNORMAL TRACE ELEMENTS IN MAN: ARSENIC", JOURNAL OF CHRONIC DISEASES, 1966, VOL. 19, PP. 85-106. THIS RANGE IS CONFIRMED BY A NUMBER OF STUDIES REPORTED BY H.W. HARVEY IN THE CHEMISTRY AND FERTILITY OF SEA WATER, CAMBRIDGE (1957), P. 130.

THE MAXIMUM ALLOWABLE CONCENTRATION FOR POTABLE WATER [illegible] CONSTITUTES RANGES FROM .050 TO [illegible] [illegible] REPORTED [illegible]

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

ONE-TIME DISPOSAL OF ONE MILLION GALLONS OF LIQUID ARSENIC WASTE IN THE SEA

TITLE & DESCRIPTION

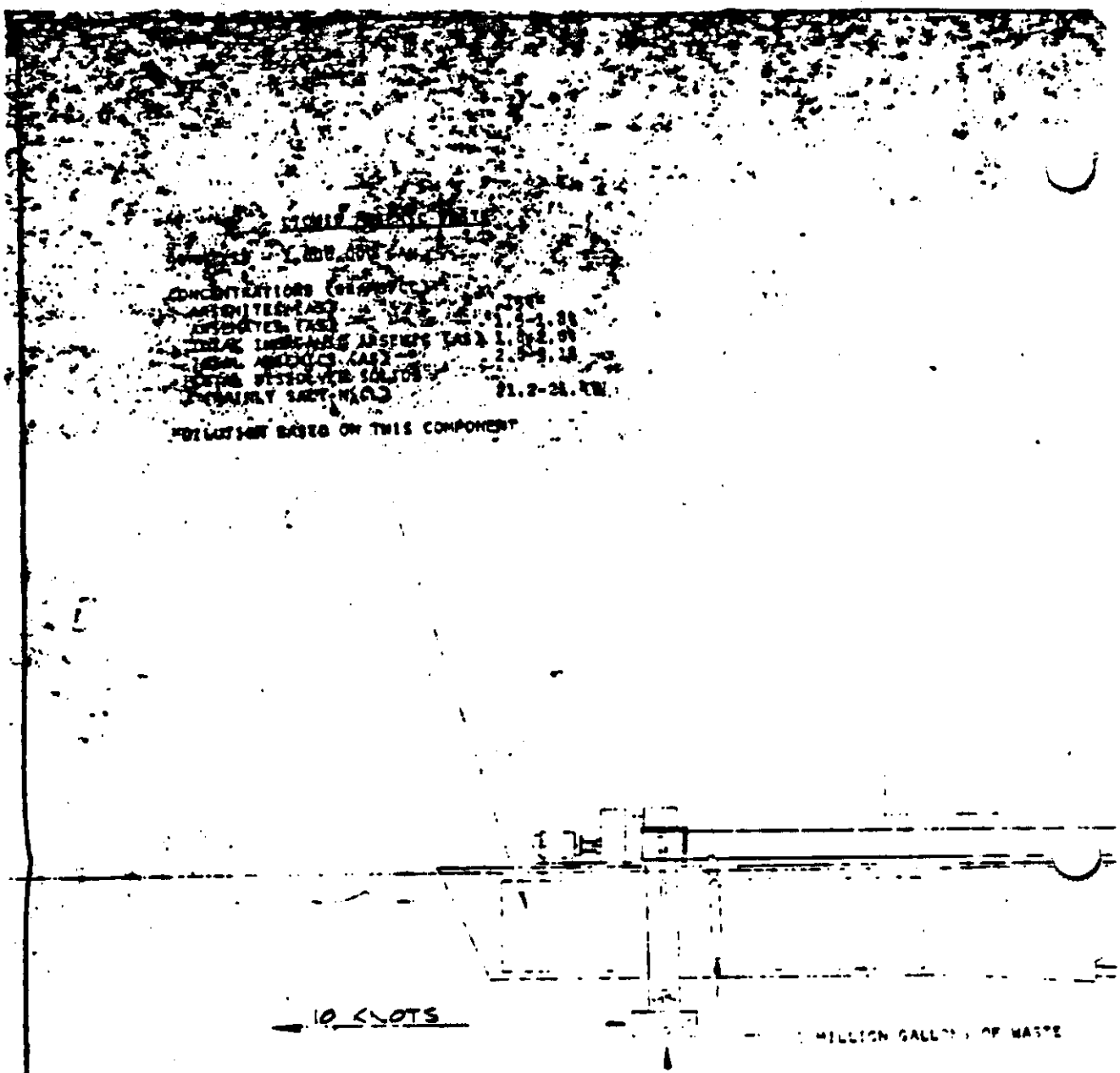
ROHM AND HAAS
ENGINEERING DIVISION
BRISTOL, PA.

DRAWN BY	DATE	CHECKED	DATE	APPROVED

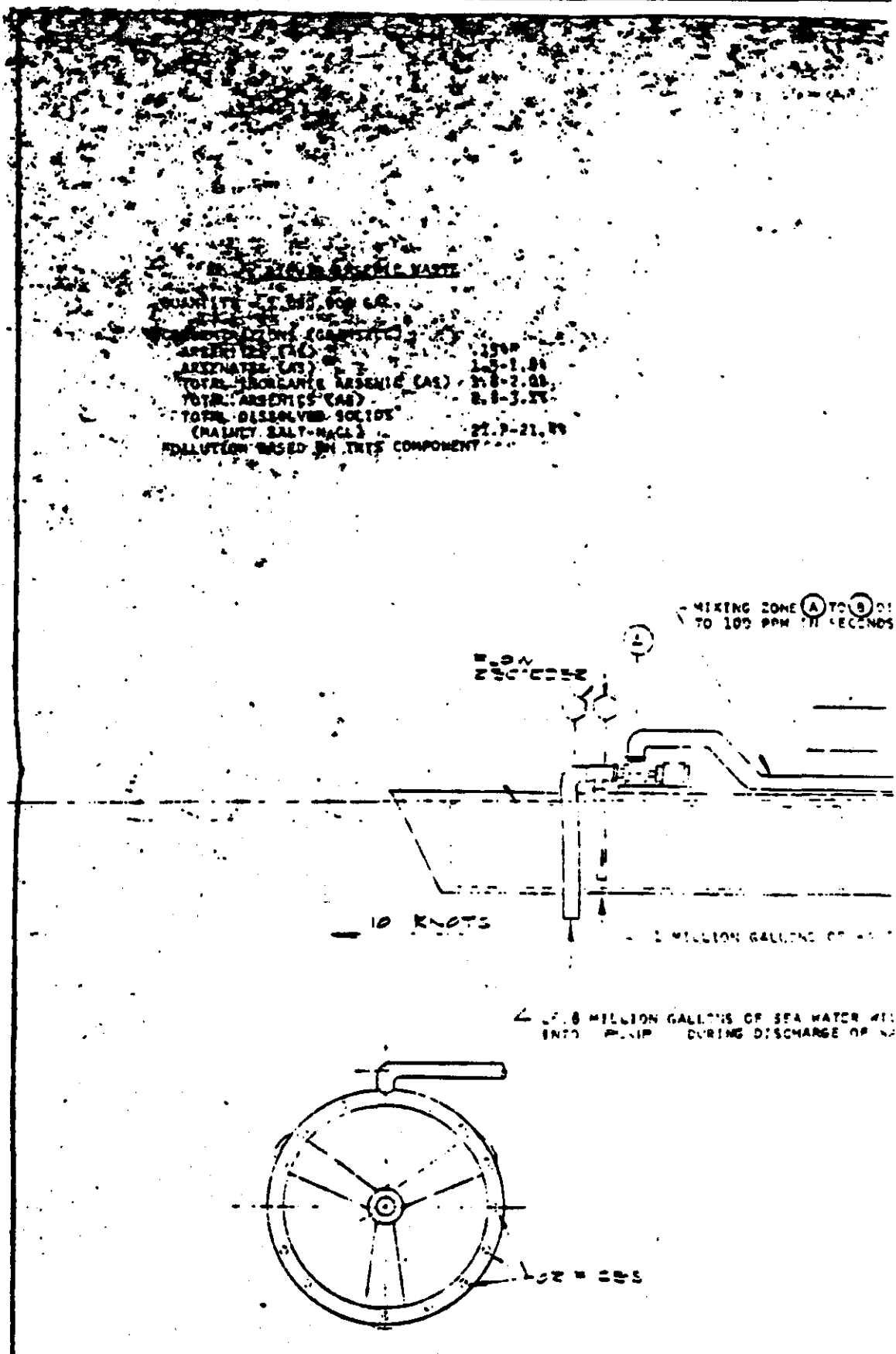
2209.01 ART00206

JOB NUMBER

DRAWING NUMBER


10 KNOTS
MILLION GALLONS OF WASTE
1.8 BILLION GALLONS OF CPA WATER WILL FL
INTO PUMP DURING DISCHARGE OF WASTE

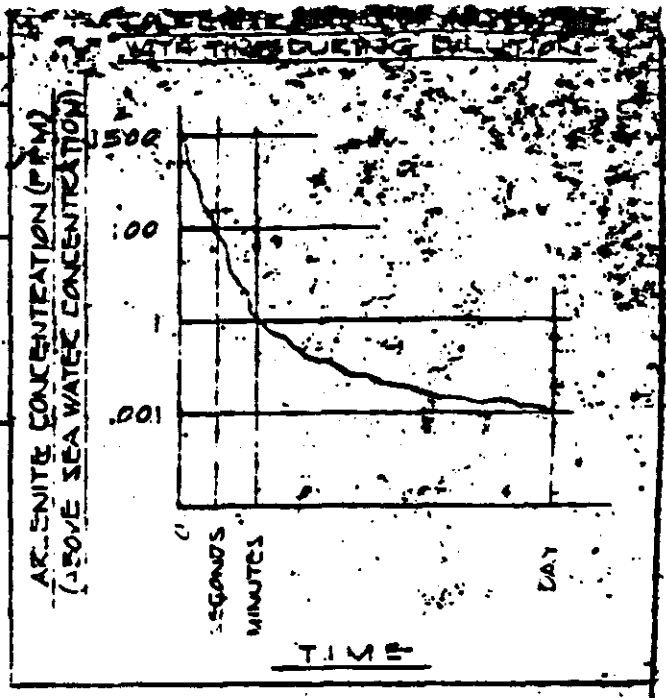
AR100207



SECTION A-A

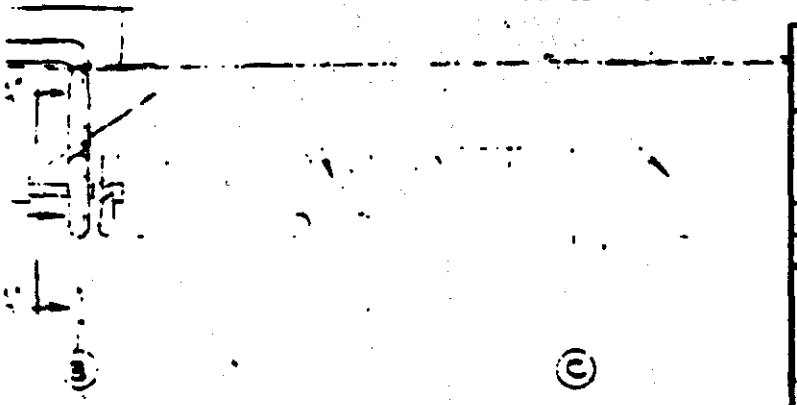
AR100208

TOTAL TIME OF DISCHARGE (DAYS)	PUMPING RATE (GPM)	MINIMUM DIA. OF SHIP'S PROPELLOR (FT)
1	11,700	12.5
3	3,900	8.4
7	1,700	6.2
15	780	3.75



MIXING ZONE (B) TO (C) DILUTION FROM 1.00 PPM TO .1 PPM IN MINUTES. CONCENTRATIONS ARE IN ADDITION TO ARSENIC IN THE SEA WATER.

MIXING FROM OCEAN DISPERSION WELL DILUTES WASTE FROM .1 PPM TO .001 PPM IN A DAY. CONCENTRATIONS ARE IN ADDITION TO THE ARSENIC IN THE SEA WATER. LOCATION OF DISCHARGE TO BE AT LEAST 12 MILES FROM SHORE.



1.8 BILLION GALLONS OF SEA WATER WILL FLOW INTO PROPELLOR DURING DISCHARGE OF WASTE (DISTANCE OF VESSEL TRAVEL TIMES AREA OF PROPELLOR)

NOTE:

CONCENTRATION OF ARSENIC IN SEA-WATER IS .002 TO .005 PPM ARSENIC AS STATED BY H.A. SCHROEDER AND J.J. BALASSA IN "ABNORMAL TRACE ELEMENTS IN MAN: ARSENIC", JOURNAL OF CHRONIC DISEASES, 1966, VOL. 19, PP. 85-106. THIS RANGE IS CONFIRMED BY A NUMBER OF STUDIES REPORTED BY H.W. HARVEY IN THE CHEMISTRY AND FERTILITY OF SEA WATER, CAMBRIDGE (1966), P. 119.

THE MAXIMUM ALLOWABLE CONCENTRATION FOR POTABLE WATER IN VARIOUS COUNTRIES RANGES FROM .050 TO .250 PPM ARSENIC AS REPORTED IN THE SCHROEDER AND BALASSA PAPER CITED ABOVE.

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

A ONE-TIME DILUTION OF ONE MILLION GALLONS OF [illegible] ARSENIC WASTE IN THE SEA

TITLE & DESCRIPTION

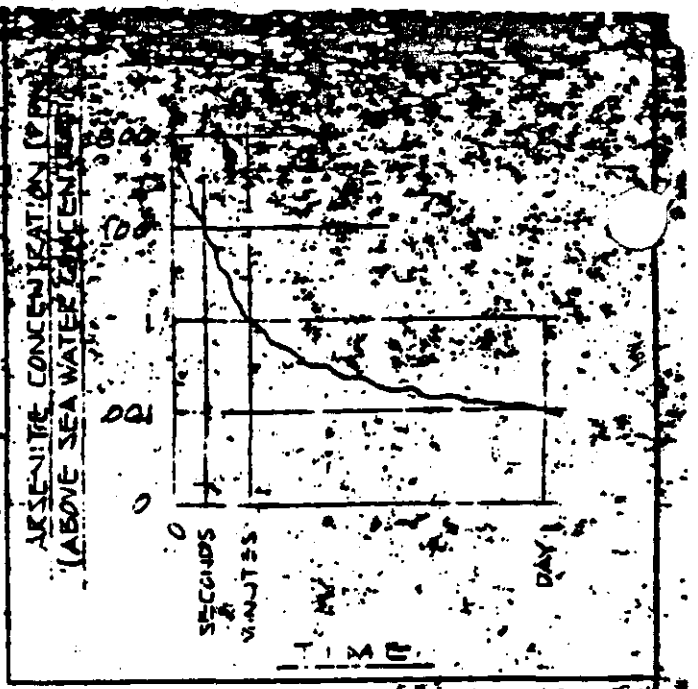
ROHM AND HAAS
ENGINEERING DIVISION
BRISTOL, PA.

DRAWN BY	DATE	CHECKED	DATE	APPROVED

JOB NUMBER 2209.01 SCALE

DRAWING NUMBER AR100209

	695	4.5
	232	3.6
	100	5.4
	46	3.75



MIXING OF (A) TO (C) DILUTION FROM 1000 PPM TO 100 PPM IN SECONDS

MIXING FROM (A) TO (C) DILUTION FROM 1 PPM TO .1 PPM IN MINUTES.
CONCENTRATIONS ARE IN ADDITION TO THE ARSENIC IN SEA WATER.

MIXING FROM OCEAN DISPERSION WILL DILUTE WASTE FROM 1 PPM TO .001 PPM IN A DAY. CONCENTRATIONS ARE IN ADDITION TO THE ARSENIC IN SEA WATER. LOCATION OF DISCHARGE IS AT LEAST 125 MILES FROM SHORE.

GALLONS OF SEA WATER ... PROPELL ... DISTANCE OF VESSEL TRAVEL ... OF MILLION

NOTE:

CONCENTRATION OF ARSENIC IN SEA WATER IS ... .002 PPM ARSENIC AS STATED BY H.A. ... AND J.J. ... IN "ARSENICAL ... ELEMENTS IN NAT. ... ARSENIC", JOURNAL OF ... VOL. 9, PP. ... THIS RANGE IS CONFIRMED BY A NUMBER OF STUDIES REPORTED BY K.K. TUREKIAN IN "... CHEMISTRY AND FERTILITY OF SEA WATER", CAMBRIDGE (1968), P. 150.

THE MAXIMUM ALLOWABLE CONCENTRATION FOR POTABLE WATER IN VARIOUS COUNTRIES RANGES FROM .001 TO .050 PPM ARSENIC AS REPORTED BY THE SCHOLDER AND BALASSA PAPER CITED ABOVE.

REV	DATE	DESCRIPTION	APPROVED
		REVISIONS	

A ONE-TIME DILUTION
OF ONE MILLION GALLONS
OF LIQUID ARSENIC WASTE
IN THE SEA

TITLE & DESCRIPTION

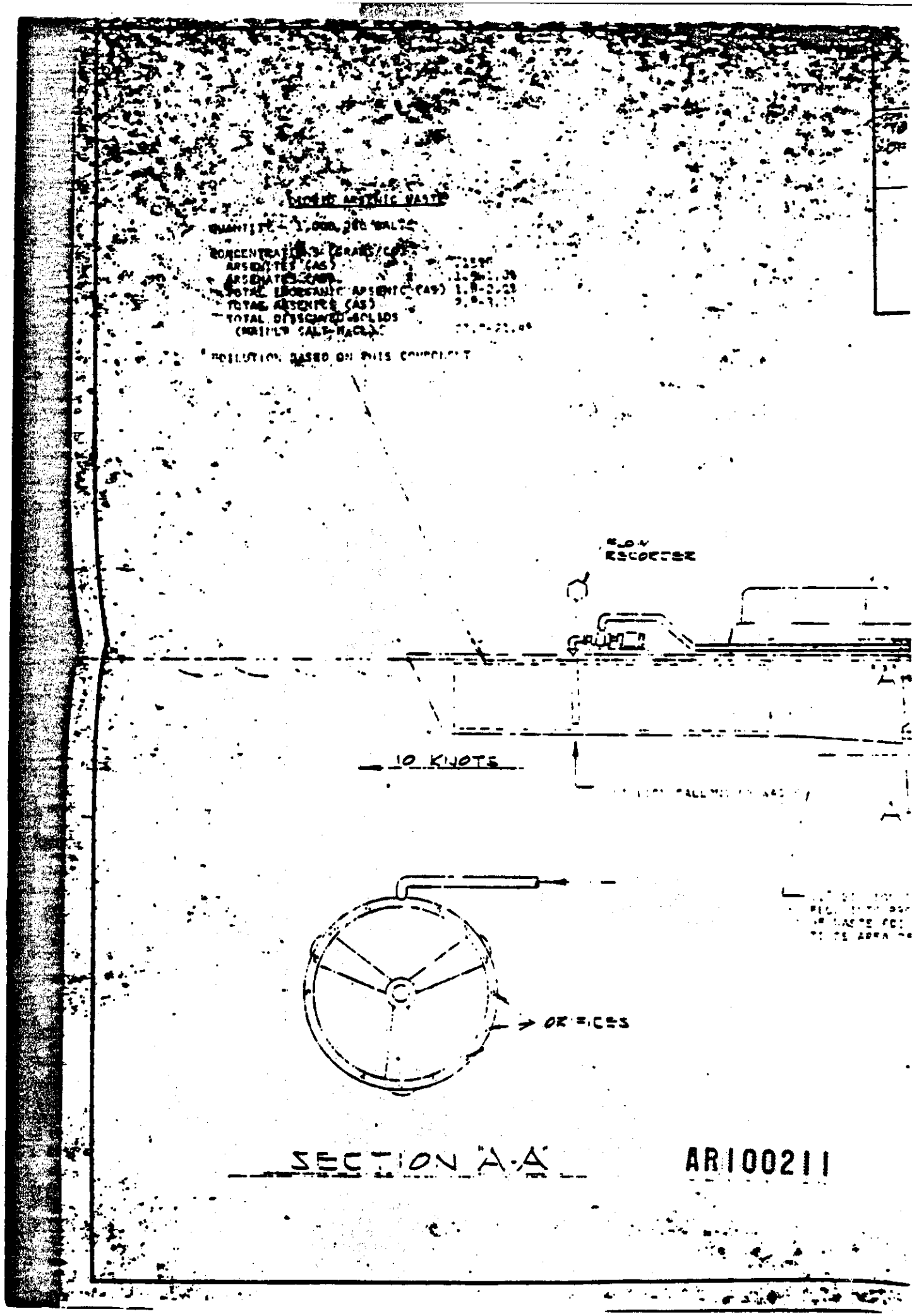
ROHM AND HAAS
ENGINEERING DIVISION

DRAWN BY	DATE	CHECKED	DATE	APPROVED

JOB NUMBER 2209.01 SCALE

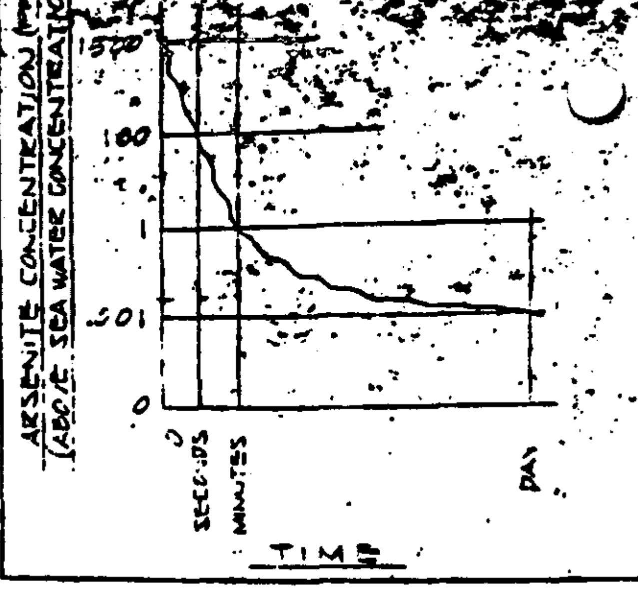
DRAWING NUMBER AR100210

AR100210



SECTION A-A

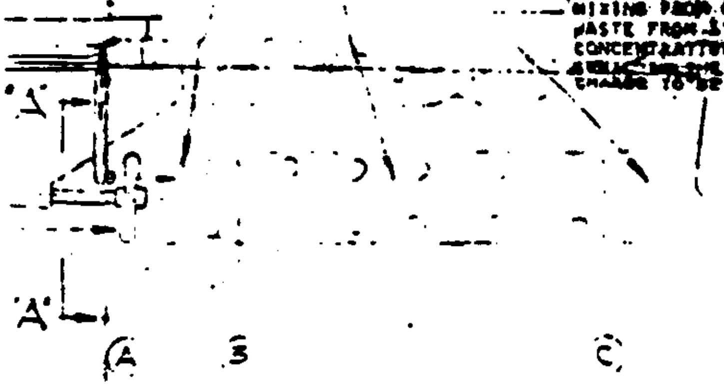
[illegible] TIME OF DISCHARGE (DAYS)	PUMPING RATE (GPM)	MINIMUM DIA. OF SHIPS PROPELLOR (FT.)
1	655	14.5
3	232	8.4
7	100	5.4
15	46	3.75



MIXING ZONE (A) TO (B) DILUTION FROM 1500 PPM TO 100 PPM IN SECONDS

MIXING ZONE (B) TO (C) DILUTION FROM 100 PPM TO 1 PPM IN MINUTES. CONCENTRATIONS ARE IN ADDITION TO ARSENIC IN THE SEA WATER.

MIXING FROM OCEAN DISPERSION WILL DILUTE WASTE FROM 1 PPM TO .001 PPM IN A DAY. CONCENTRATIONS ARE IN ADDITION TO THE AR- [illegible] SEA WATER. LOCATION OF DIS- CHARGE TO BE AT LEAST 125 MILES FROM SHORE.



BILLION GALLONS OF SEA WATER WILL
INTO PROPELLOR DURING DISCHARGE
BASIS DISTANCE OF VESSEL TRAVEL
X AREA OF PROPELLOR)

NOTE:

CONCENTRATION OF ARSENIC IN SEA WATER IS .002 TO .005 PPM ARSENIC AS STATED BY H.A. SCHROEDER AND J.J. BALASSA IN "ABNORMAL TRACE ELEMENTS IN MAN: ARSENIC", JOURNAL OF CHRONIC DISEASES, 1966, VOL. 19, PP. 85-106. THIS RANGE IS CONFIRMED BY A NUMBER OF STUDIES REPORTED BY H.W. HARVEY IN THE CHEMISTRY AND FERTILITY OF SEA WATER, CAMBRIDGE (1956), P. [illegible]

THE MAXIMUM ALLOWABLE CONCENTRATION FOR POTABLE WATER IN VARIOUS COUNTRIES RANGES FROM .050 TO .15 PPM ARSENIC AS REPORTED IN THE SCHROEDER AND BALASSA PAPER CITED ABOVE.

REV	DATE	DESCRIPTION	APPROVED

REVISIONS

A ONE-TIME DILUTION
OF ONE MILLION GALLONS
OF LIQUID ARSENIC WASTE
IN THE SEA

TITLE & DESCRIPTION

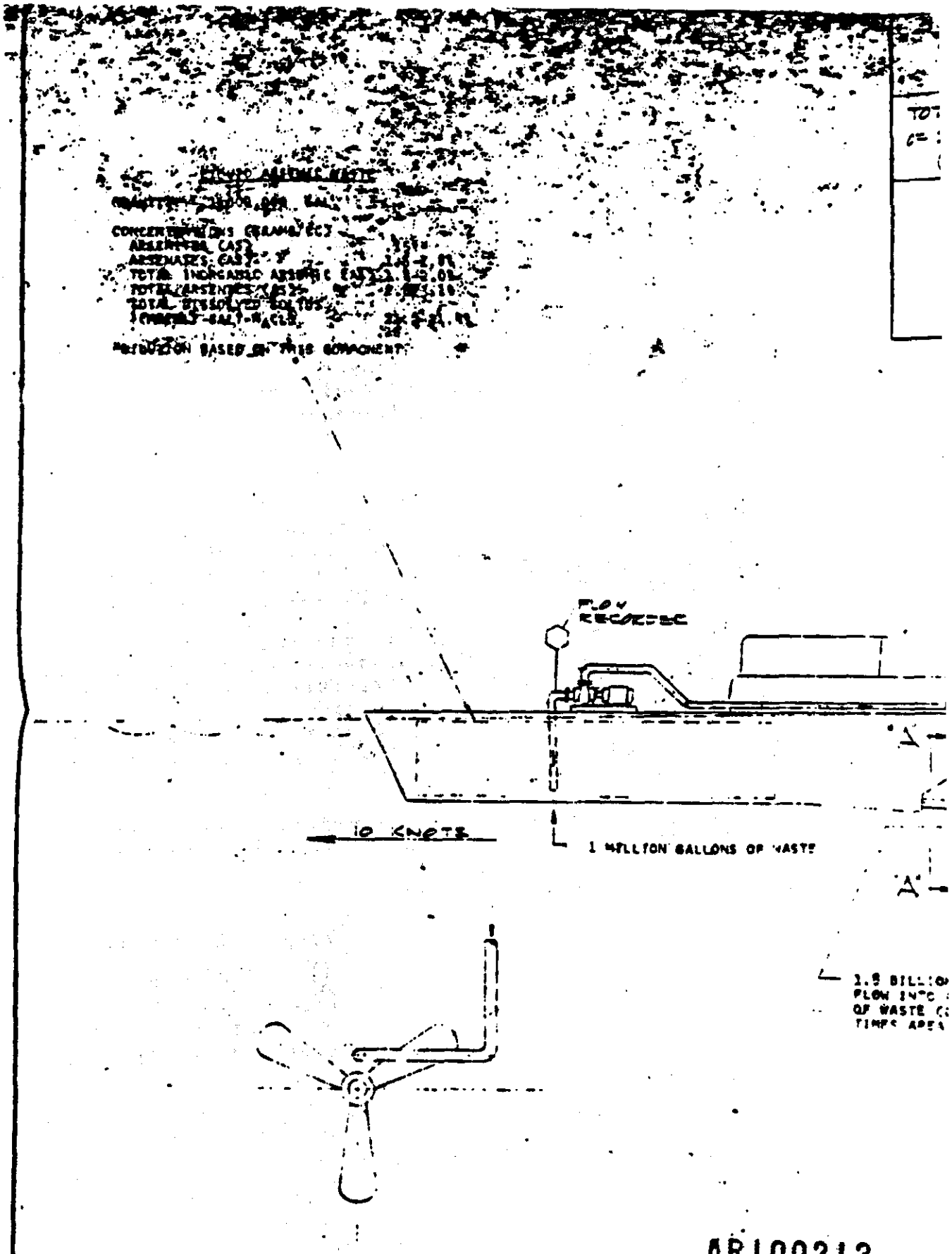
ROHM AND HAAS
ENGINEERING DIVISION
BRISTOL, PA.

DRAWN BY	DATE	CHECKED	DATE	APPROVED

2209.01

AR100212 2

DRAWING NUMBER



SECTION 'A-A'

AR100213